

**WHAT IS CLAIMED IS:**

1. A planarization method using anisotropic wet etching, which can be applied on a substrate having an insulating layer thereon, the insulating layer  
5 having trenches therein, comprising:

mixing  $\text{H}_2\text{SO}_4$ ,  $\text{H}_3\text{PO}_4$ , HF and  $\text{H}_2\text{O}$  to form an etching solution; and

placing the substrate into the etching solution to make the etching solution  
pass the surface of the insulating layer at a flow rate to etch the insulating layer.

10 2. The planarization method of claim 1, wherein the concentration of the  $\text{H}_2\text{SO}_4$  is about 98% by weight.

3. The planarization method of claim 1, wherein the concentration of the  
15  $\text{H}_3\text{PO}_4$  is about 85% by weight.

4. The planarization method of claim 1, wherein the concentration of the  
HF is about 1% by weight.

20 5. The planarization method of claim 1, wherein the volume ratio of  $\text{H}_2\text{SO}_4$   
and  $\text{H}_3\text{PO}_4$  : HF is about 50 – 100 : 1.

6. The planarization method of claim 1, wherein the etching rate of the  
etching solution to an insulating layer with a planar surface is about 50 – 80  
Å/min.

25 7. The planarization method of claim 1, wherein the insulating layer is a  
silicon oxide layer.

8. A planarization method using anisotropic wet etching, which can be applied on a substrate having a first insulating layer thereon, the first insulating layer having large trenches and small trenches therein, comprising:

conformably forming a second insulating layer on the first insulating layer,  
a thickness of the second insulating layer is about the same as a depth of the large and the small trenches;

patterning the second insulating layer to form protrusions in the large trenches, a distance between the neighboring protrusions is about the same as the width of the small trenches;

mixing  $\text{H}_2\text{SO}_4$ ,  $\text{H}_3\text{PO}_4$ , HF and  $\text{H}_2\text{O}$  to form an etching solution; and

placing the substrate into the etching solution to make the etching solution pass the surface of the first and the second insulating layer at a flow rate to etch the first and the second insulating layer.

9. The planarization method of claim 8, wherein the concentration of the  $\text{H}_2\text{SO}_4$  is about 98% by weight.

10. The planarization method of claim 8, wherein the concentration of the  $\text{H}_3\text{PO}_4$  is about 85% by weight.

11. The planarization method of claim 8, wherein the concentration of the HF is about 1% by weight.

12. The planarization method of claim 8, wherein the volume ratio of  $\text{H}_2\text{SO}_4$  and  $\text{H}_3\text{PO}_4$  : HF is about 50 – 100 : 1.

13. The planarization method of claim 8, wherein the etching rate of the etching solution to an insulating layer with a planar surface is about 50 – 80 Å/min.

14. The planarization method of claim 8, wherein the first insulating layer is a silicon oxide layer.

15. The planarization method of claim 8, wherein the second insulating layer is a silicon oxide layer.

16. A planarization method using anisotropic wet etching, which can be applied on a substrate having an insulating layer thereon, the insulating layer having large trenches and small trenches therein, comprising:

using an insulating material to form protrusions in the large trenches, wherein a distance between the neighboring protrusions is about the same as the width of the small trenches and a thickness of the protrusions is about the same as a depth of the large and the small trenches;

mixing  $\text{H}_2\text{SO}_4$ ,  $\text{H}_3\text{PO}_4$ , HF and  $\text{H}_2\text{O}$  to form an etching solution; and placing the substrate into the etching solution to make the etching solution pass the surface of the insulating layer and the protrusions at a flow rate to etch the insulating layer and the protrusions.

17. The planarization method of claim 16, wherein the concentration of the  $\text{H}_2\text{SO}_4$  is about 98% by weight.

18. The planarization method of claim 16, wherein the concentration of the  $\text{H}_3\text{PO}_4$  is about 85% by weight.

19. The planarization method of claim 16, wherein the concentration of the HF is about 1% by weight.

20. The planarization method of claim 16, wherein the volume ratio of  $\text{H}_2\text{SO}_4$  and  $\text{H}_3\text{PO}_4$  : HF is about 50 – 100 : 1.

21. The planarization method of claim 16, wherein the etching rate of the etching solution to an insulating layer with a planar surface is about 50 – 80 Å/min.

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